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Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/525,468
Filing Date: February 24, 2005
Appellant(s): GENGER ET AL.

Eamonn P. Morrison
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 26, 2009 appealing from the Office action mailed June 27, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

3,349,007	CIBOROWSKI	10-1967
3,957,876	RAPOPORT	5-1976

5,449,501	LUEBKE	9-1995
2,931,834	CROUCH	4-1960

Lewis, R. J. "theoretical plate" Hawley's Condensed Chemical Dictionary, twelfth ed., 1993, p. 1139

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 8, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over S. M. Ciborowski et al. (US 3,349,007) in view of Rapoport et al. (US 3,957,876) and Luebke et al. (US 5,449,501) and further in view of W. W. Crouch et al. (US 2,931,834) and Richard J. Lewis (Hawley's Condensed Chemical Dictionary, twelfth edition, 1993, page 1139).

S. M. Ciborowski et al. teach a process for the oxidation of cyclohexane with air (see entire disclosure, in particular column 1, line 65 to column 2, line 61). The process is conducted in an oxidation apparatus and the oxidation raw product is distilled in a rectifying column and the concentrated oxidation product is removed via a bottom stream therefrom (see column 1, line 70 to column 2, line 6; column 2, lines 30-33; and the figure). The unreacted cyclohexane condensate obtained from the rectifying column is partly returned to the top of rectifying column as a reflux, partly put into the cooling system of the oxidation apparatus and the rest is recycled to the oxidation reactor for further oxidation (see column 2, lines 24-29). Water is separated along with the unreacted cyclohexane from the top of the rectifying column, the water is taken off and the unreacted cyclohexane is utilized (see claim 3 and the figure).

S. M. Ciborowski et al. fail to teach carrying out the oxidation in the presence of a catalyst and introducing the air in at least two substreams.

Rapoport et al. teach a process for the catalytic oxidation of cyclohexane wherein an oxygen containing gas is fed as more than one substream (see entire disclosure, in particular column 2, lines14-39; column 3, lines 5-35, and column 4, lines 18-54, most particularly column 2, lines 37-39 and column 4, lines 18-19).

The use of a catalyst and more than one substream as taught by Rapoport et al. in the process of S. M. Ciborowski et al. would have been obvious because Rapoport et al. has shown that the use of a catalyst and the addition of an oxidizing gas to more than one tray in an oxidation reaction is known and thus is recognized as part of the ordinary capabilities of one skilled in the art.

S. M. Ciborowski et al. fail to teach carrying out the oxidation and separation in a rectification column. Thus, S. M. Ciborowski et al. fail to teach the claimed features (a)-(d) of the rectification column

Luebke et al. teach an apparatus having the claimed features (a)-(c) for catalytic distillation (see entire disclosure, in particular figure 1; column 4, lines 12-60 and column 7, lines 4-65). It is taught that the subject apparatus can be used to perform any reaction which is amendable to catalytic distillation (see column 7, lines 4-6). In general this includes any exothermic reaction which occurs primarily in the liquid phase and produces a reaction product which is less volatile than the feed compounds (see column 7, lines 6-9). The apparatus of Luebke et al. employs conventional fractional distillation equipment (see column 3, lines 24-26).

One having ordinary skill in the art at the time the invention was made would have found it obvious to operate the process of S. M. Ciborowski et al. in the apparatus

of Luebke et al. since Luebke et al. teach that their apparatus may be used in any exothermic reaction which occurs primarily in the liquid phase and produces a reaction product which is less volatile than the feed compounds. The skilled artisan would have been motivated to operate the process of S. M. Ciborowski et al. in the apparatus of Luebke et al., since it would allow S. M. Ciborowski et al. to simultaneously perform their reaction and separation steps in a single apparatus.

Lewis teaches that as many as 100 theoretical plates are used in laboratory and industrial operation (see page 1139). Lewis also discloses that the effectiveness of a fractionating column is measured in terms of theoretical plates.

One having ordinary skill in the art at the time the invention was made would have been motivated to use as many as a hundred theoretical plates, as disclosed by Lewis, including the claimed 20 to 40 theoretical plates of (d), in the apparatus of Luebke et al. for use in the process of S. M. Ciborowski et al., depending upon the degree of separation desired.

With respect to the bottom evaporator and phase separator the Applicants have simply used these in the manner in which they are known to be used.

S. M. Ciborowski et al. fail to expressly teach that the water present in the reaction mixture was by-produced in the reaction and that it is withdrawn continuously from the reaction.

Crouch et al. teach a process for the oxidation of cyclohexane (see entire disclosure). It is taught that water is formed during the reaction and removed via flashing (see column 3, lines 5-16).

One having ordinary skill in the art at the time the invention was made would have found it obvious that water is formed in the reaction of S. M. Ciborowski et al., since Crouch et al. teach that water is produced during the oxidation of cyclohexane. The skilled artisan would have been motivated to continuously remove such water, since Crouch et al. teach that it is desirable to remove the water since this serves to concentrate the oxygenated products (see column 3, lines 5-16).

S. M. Ciborowski et al. do not teach a temperature range as disclosed in claim 8. However, one having ordinary skill in the art at the time the invention was made would be able to determine a suitable reaction temperature for carrying out the desired oxidation reaction.

(10) Response to Argument

The Appellants submit that Luebke neither teaches nor suggests that its reactor column is capable of performing the essential aspect of the Ciborowski process and apparatus as discussed supra.

This submission should not be persuasive because the objective of the Ciborowski process is to successfully distill off chemical substances in which the substrate is only partly reacted and must be distilled off from the post-reaction mixture and returned to the process (see column 1, lines 11-15). Ciborowski teaches that this problem is particularly acute in hydrocarbon oxidation in the liquid phase with gases containing molecular oxygen, e.g., in cyclohexane oxidation to cyclohexanol and cyclohexanone (see column 1, lines 15-19). The apparatus disclosed by Ciborowski is one means of solving this problem without several of the disadvantages in certain

known methods of distilling off chemical substances (see column 1, lines 28-64). Luebke teaches that their vapor-liquid contacting apparatus is useful as a reactor in hydrocarbon conversion reactions (see column 1, lines 7-9). Luebke teaches that the apparatus of their invention can be used to perform any reaction which is amendable to catalytic distillation (see column 7, lines 4-6). It is taught that in general this includes any exothermic reaction which occurs primarily in the liquid phase and produces a reaction product which is less volatile than the feed compounds (see column 7, lines 6-9). The cyclohexane oxidation process disclosed by Ciborowski meets these requirements and thus the skilled artisan would have a reasonable expectation of successfully carrying out the process of Ciborowski in the apparatus of Luebke.

The Appellants submit that such a wholesale substitution of the apparatus of Ciborowski for the reactor column of Luebke would render the Ciborowski process unsatisfactory for its intended purpose and change its principle of operation.

This submission should not be persuasive because if the intended purpose of Ciborowski is to eliminate any need to separate the condensate obtained by liquefication of the vapors, making it possible to avoid losses of cyclohexane associated with such separation, then the use of the Luebke apparatus would allow Ciborowski to fulfill its intended purpose, since the cyclohexane and water vapor of Ciborowski would not be liquefied in the apparatus of Luebke.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Rosalynd Keys/

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